What is claimed is:

1. A compound, comprising one or more chromium atoms bonded to one or more unsaturated fatty acid residues, wherein the unsaturated fatty acid residue is not derived solely from oleic acid.

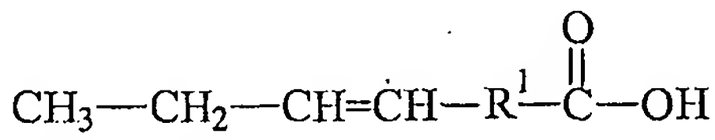
2. The compound of claim 1, wherein the unsaturated fatty acid residue is derived from fish oil.

3. The compound of claim 1, wherein the unsaturated fatty acid residue comprises at least 20 carbon atoms.

4. The compound of claim 1, wherein the unsaturated fatty acid residue comprises at least one pair of methylene interrupted unsaturated bonds.

5. The compound of claim 1, wherein the unsaturated fatty acid residue is derived from an omega-3 fatty acid.

6. The compound of claim 1, wherein the unsaturated fatty acid residue is derived from a compound comprising the formula:



wherein R^1 is a C_3-C_{40} alkyl or alkenyl group comprising at least one double bond.

7. The compound of claim 6, wherein R^1 has from 2 to 6 double bonds.

8. The compound of claim 1, wherein the unsaturated fatty acid residue is derived from linoleic acid, linolenic acid, gamma-linolenic acid, arachidonic acid, mead acid, stearidonic acid, alpha-eleostearic acid, eleostearic acid, pinolenic acid, docosadienic acid, docosatetraenoic acid, octadecadienoic acid, octadecatrienoic acid, eicosatetraenoic acid, or any combination thereof.

9. The compound of claim 1, wherein the unsaturated fatty acid residue is derived from eicosapentaenoic acid 20:5ω3 (EPA), docosahexaenoic acid 22:6ω3 (DHA), docosapentaenoic acid 22:5ω3 (DPA), or any mixture thereof.

10. The compound of claim 1, wherein the number of chromium atoms is from 1 to 3.

11. The compound of claim 1, wherein the number of chromium atoms is 3.

12. The compound of claim 1, further comprising one or more water molecules bonded to the chromium atom.

13. The compound of claim 1, further comprising a non-chromium atom bonded to one or more unsaturated fatty acid residues, wherein the non-chromium atom comprises a metal, transition metal, alkaline metal, an alkaline earth metal, rare earth metal, or metalloid.

14. The compound of claim 13, wherein the non-chromium compound is Zn, Mn, W, Mo, V, Nb Ta, Ga, La, Sb.

15. The compound of claim 1, wherein the compound comprises the formula:

$$[Cr_3(H_2O)_3(\mu\text{-unsaturated fatty acid residue})_6(\mu_3\text{-}O)]^+.$$

16. The compound of claim 1, wherein the compound comprises the formula:

$$[Cr_3(H_2O)_3(\mu\text{-}O_2C\text{—}R^1\text{—}CH{=}CH\text{—}CH_2\text{—}CH_3)_6(\mu_3\text{-}O)]^+$$

wherein R^1 is a C_3-C_{40} alkenyl group comprising at least one double bond.

17. The compound of claim 16, wherein R^1 has from 2 to 6 double bonds.

18. The compound of claim 15, wherein the unsaturated fatty acid residue is derived from linoleic acid, linolenic acid, gamma-linolenic acid, arachidonic acid, mead acid, stearidonic acid, alpha-eleostearic acid, eleostearic acid, pinolenic acid, docosadienic acid, docosatetraenoic acid, octadecadienoic acid, octadecatrienoic acid, eicosatetraenoic acid, or any combination thereof.

19. The compound of claim 15, wherein the unsaturated fatty acid residue is derived from eicosapentaenoic acid 20:5ω3 (EPA), docosahexaenoic acid 22:6ω3 (DHA), docosapentaenoic acid 22:5ω3 (DPA), or any mixture thereof.

20. The compound of claims 1-19, wherein the chromium is chromium(III).

21. The compound of claims 1-19, wherein the chromium is chromium(II).

22. The compound of claim 1, wherein the compound comprises a fragment having the formula $R^2R^3Cr—CrR^4R^5$, wherein R^2-R^5 are the same or different unsaturated fatty acid residues.

23. The compound of claims 1-22, wherein the compound is bioavailable.

24. The compound of claims 1-22, wherein the compound is a liquid.

25. A method for preparing a compound, comprising reacting a chromium compound and one or more unsaturated fatty acids or the salt or ester thereof, wherein the unsaturated fatty acid or the salt or ester thereof is not solely oleic acid.

26. The method of claim 25, wherein the chromium compound is in the form of a hydrate.

27. The method of claim 25, wherein the chromium compound is a chromium(III) compound.

28. The method of claim 25, wherein the chromium(III) compound is $CrCl_3$ or a hydrate thereof.

29. The method of claim 25, wherein the chromium(III) compound is $Cr(OH)_3$ or a hydrate thereof.

30. The method of claim 25, wherein the chromium compound is a chromium(II) compound.

31. The method of claim 30, wherein the chromium(II) compound is $CrCl_2$, or a hydrate thereof.

32. The method of claim 25, wherein the chromium compound comprises $Cr(SO_4)_2$, $CrCl_2.4H_2O$, CrS, CrO, $CrBr_3 \cdot 6H_2O$, CrF_3, $CrF_3 \cdot 4H_2O$, $CrCl_3$, $KCr(SO_4)_2 \cdot 12H_2O$, $Cr_2(SO_4)_3 \cdot xH_2O$, Cr_2S_3, $[Cr(H_2O)_4Cl_2]Cl \cdot 2H_2O$, $Cr(H_2O)_6Cl_3$, Cr_2O_3, $Cr_2O_3 \cdot xH_2O$, $CrPO_4 \cdot 4H_2O$, where x is an integer from 1 to 28, or any mixture thereof.

33. The method of claim 25, wherein the reacting step is performed in one or more aqueous solvents.

34. The method of claim 25, wherein the reacting step does not involve a reducing agent.

35. The method of claim 25, wherein the reacting step is performed at an elevated temperature.

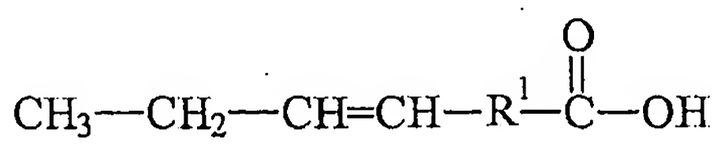
36. The method of claim 25, wherein the unsaturated fatty acid is derived from fish oil.

37. The method of claim 25, wherein the unsaturated fatty acid comprises at least 20 carbon atoms.

38. The method of claim 25, wherein the unsaturated fatty acid comprises at least one pair of methylene interrupted unsaturated bonds.

39. The method of claim 25, wherein the unsaturated fatty acid is an omega-3 fatty acid.

40. The method of claim 25, wherein the unsaturated fatty acid comprises the formula:



wherein R^1 is a C_3-C_{40} alkyl or alkenyl group comprising at least one double bond.

41. The method of claim 40, wherein R^1 has from 2 to 6 double bonds.

42. The method of claim 25, wherein the unsaturated fatty acid is linoleic acid, linolenic acid, gamma-linolenic acid, arachidonic acid, mead acid, stearidonic acid, alpha-eleostearic acid, eleostearic acid, pinolenic acid, docosadienic acid, docosatetraenoic acid, octadecadienoic acid, octadecatrienoic acid, eicosatetraenoic acid, or any combination thereof.

43. The method of claim 25, wherein the unsaturated fatty acid comprises eicosapentaenoic acid 20:5ω3 (EPA), docosahexaenoic acid 22:6ω3 (DHA), docosapentaenoic acid 22:5ω3 (DPA), or any mixture thereof.

44. The method of claim 25, further comprising reacting the unsaturated fatty acid with a non-chromium compound, wherein the non-chromium compound comprises a

metal, transition metal, an alkaline metal, alkaline earth metal, rare earth metal, or metalloid.

45. The method of claim 44, wherein the non-chromium compound is Zn, Mn, W, Mo, V, Nb Ta, Ga, La, or Sb.

46. A compound prepared by any one of the methods of claims 25-45.

47. A nutritional supplement comprising a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues.

48. The nutritional supplement of claim 47, wherein the chromium compound is the compound in any of claims 1-24 and 46.

49. The nutritional supplement of claim 47, comprising from about 10 to about 3000 micrograms of chromium.

50. The nutritional supplement of claim 47, comprising from about 50 to about 200 micrograms of chromium.

51. The nutritional supplement of claim 47, wherein the supplement is in the form of a tablet, gel-cap, capsule, liquid, or syrup.

52. A delivery device comprising a compound in any of claims 1-24 and 46.

53. The delivery device of claim 52, wherein the device comprises a microcapsule, a microsphere, a nanosphere or nanoparticle, a liposome, a noisome, a nanoerythrosome, a solid-liquid nanoparticle, a leuprolide, a gel, a gel capsule, a tablet, a lotion, a cream, a spray, an emulsion, or a powder.

54. The delivery device of claim 52, wherein the device comprises a microcapsule, wherein the microcapsule comprises an agglomeration of primary microcapsules, each individual primary microcapsule having a primary shell and the agglomeration being encapsulated by an outer shell, wherein the compound in any of claims 1-24 and 46 is encapsulated in the primary microcapsule.

55. The delivery device of claim 54, wherein the primary shell and the outer shell comprises gelatin type A, gelatin type B, polyphosphate, gum arabic, alginate, chitosan, carrageenan, pectin, starch, modified starch, alfa-lactalbumin, beta-lactoglobumin, ovalbumin, polysorbiton, maltodextrins, cyclodextrins, cellulose, methyl cellulose, ethyl cellulose, hydropropylmethylcellulose, carboxymethylcellulose, milk protein, whey protein, soy protein, canola protein, albumin, chitin, polylactide, poly-lactide-co-glycolide, polylysine, kosher gelatin, non-kosher gelatin, Halal gelatin, non-Halal gelatin, or a mixture thereof.

56. The delivery device of claim 54, wherein the primary shell and the outer shell comprises gelatine type A having a Bloom strength of from 0 to 350.

57. The delivery device of claim 54, wherein the primary shell and the outer shell comprises a zero bloom fish gelatin.

58. The delivery device of claim 54, further comprising an additional shell surrounding the outer shell, wherein at least one of the primary, outer, and additional shells comprise a complex coacervate.

59. A foodstuff comprising the compound in any of claims 1-24 and 46 or the delivery device in any of claims 54-58.

60. The foodstuff of claim 59, wherein the foodstuff is a baked good, a pasta, a meat product, a frozen dairy product, a milk product, a cheese product, an egg product, a condiment, a soup mix, a snack food, a nut product, a plant protein product, a hard candy, a soft candy, a poultry product, a processed fruit juice, a granulated sugar, a sauce, a gravy, a syrup, a nutritional bar, a beverage, a dry beverage powder, a jam or jelly, a fish product, or pet companion food.

61. The foodstuff of claim 59, wherein the foodstuff is bread, tortillas, cereal, sausage, chicken, ice cream, yogurt, milk, salad dressing, rice bran, fruit juice, a dry beverage powder, rolls, cookies, crackers, fruit pies, or cakes.

62. A method of lowering cholesterol levels, triglyceride levels, or a combination thereof in a subject, comprising the step of administering an effective amount of a

chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

63. A method of supplementing essential trace elements in a subject, the method comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

64. A method improving insulin sensitivity in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

65. A method of reducing hyperglycemia in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

66. A method of reducing hypercholesterolemia in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

67. A method of reducing body fat in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium

atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

68. A method of promoting weight loss in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

69. A method of treating or preventing diabetes in a subject, comprising the step of administering an effective amount of a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

70. The method of claim 69, wherein the treating diabetes comprises reducing the blood glucose level in the subject.

71. A method for delivering a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues, a nutritional supplement comprising the chromium compound, a delivery device comprising the chromium compound, or a foodstuff comprising the chromium compound to the subject.

72. A pharmaceutical formulation comprising a chromium compound comprising one or more chromium atoms bonded to one or more fatty acid residues and a pharmaceutically acceptable carrier.

73. A method for lowering triglycerides in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid, to the subject, wherein the subject is desirous of lowering its triglyceride level.

74. A method for lowering depression in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid, to the subject, wherein the subject is desirous of lowering its depression level.

75. A method for lowering inflammation in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid, to the subject, wherein the subject is desirous of lowering its inflammation level.

76. A method for lowering blood pressure in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid, to the subject, wherein the subject is desirous of lowering its blood pressure level.

77. A method for lowering arrhythmias in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid, to the subject, wherein the subject is desirous of lowering its arrhythmias.

78. A method for increasing visual acuity in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid to the subject, wherein it is desired that the subject increases its visual acuity.

79. A method for increasing cognitive development in a subject comprising administering the composition of claim 1, wherein the composition comprises an omega 3 fatty acid to the subject, wherein it is desired that the subject increases its cognitive development.